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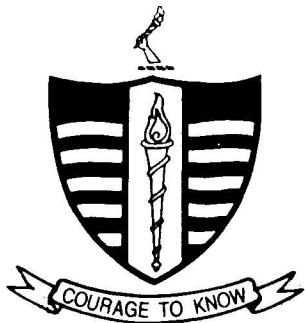
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DEPARTMENT OF ECONOMICS
GOVERNMENT COLLEGE, LAHORE - PAKISTAN

**DEFENSE EXPENDITURES IN PAKISTAN:
A SOURCE OF STIMULUS FOR OR COMPETITION
WITH THE PRIVATE SECTOR?**

By

Robert E. Looney*

Introduction:

Toward the end of 1988, Pakistan's deteriorating resource situation caused a financial crisis, many remnants of which still exist today. In 1988 the Government's budget deficit reached 8.5% of Gross Domestic Product (GDP), inflation accelerated, the current account deficit doubled to 4.3% of Gross National Product (GNP), the external debt service ratio reached 28% of export earnings, and foreign exchange reserves fell in half to \$438 million, equal to less than three weeks of imports.¹

These developments have eroded the ability of the government to affect the country's development process. In fact, the encouragement of private sector activity, particularly investment, is the only viable option open to the authorities. It follows that for policy purposes the most important issue involves restructuring government expenditures and their financing in a manner that would provide the maximum inducement to private sector capital formation, especially in manufacturing. Operationally, this means finding an optimal balance between the government's three most important budgetary items: defense, public consumption and infrastructural development. More importantly because there is

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abundant evidence² that the government's deficits have crowded out a certain amount of private investment, the authorities must achieve this balance within the context of a reduced level of expenditures and/or tax increases.

Defense expenditures are a logical area for budgetary cuts: current expenditures account for the major part of government budgetary allocations, averaging 65-75 percent in recent years. In fact, in recent years defense expenditures together with debt servicing have accounted for around 80 percent of current expenditures.

While not necessarily arguing that reduced defense expenditures would free sufficient funds to restore the country's deteriorating capital stock,³ the purpose of this paper is to examine whether defense expenditures have affected the private sector's willingness and ability to invest in manufacturing. Has the general impact of defense expenditures on private investment in manufacturing differed significantly from that associated with other categories of Government expenditures? If so, in what regard? Are these differences associated with the manner in which defense and expenditures in other areas are funded?

Background:

As noted, previous studies have suggested that government expenditures in Pakistan have been a mixed blessing. On the one hand, these expenditures have the potential to increase private sector profitability either through increases in aggregate demand (the Keynesian effect) and/or cost reductions (the infrastructural effect). On the other hand, public expenditures appear to compete for funds with the

private sector, thus reducing *ceteris paribus* the total volume of private capital formation.

Apparently these effects vary by expenditure category. For example, infrastructure investment has played a passive role in stimulating follow-on private investment⁴. Surprisingly, there is little evidence that government investment in manufacturing crowds out private investment. Instead there is a much greater likelihood that other forms of government investment may be responsible for the private sector's funding difficulties. In particular government investment in public enterprises and general government investment seem to be more responsible for the country's increasing fiscal imbalances.

Little can be said on these issues until the issue of causation is adequately resolved:

1. Often in studies of this type the direction of causation has implicitly been assumed to go from government deficits to expanded domestic borrowing to interest rate increases and ultimately reduced private investment. One could just as easily argue that increased levels of private investment have placed pressure on the government, wishing to aid private investment while simultaneously lacking adequate funding for major infrastructural programs, may first grant the private sector various forms of relief such as tax holidays followed by modest increases in public investment. The outcome of this process would be expanded deficits, but not necessarily the crowding out of private investment in the classical sense. The causation issue must be addressed before any definitive conclusion can be made concerning crowding out.

2. As a related issue, the timing of these impacts needs to be identified. Many effects associated with government deficits are likely to have a delayed impact on private investment decisions. Again because the timing of these effects has not been identified, the patterns of causation are unclear.⁵
3. If we assume that interest rate effects are only one factor associated with the government deficit as it pertains to private investment, the theory of crowding out becomes unclear as to the relevant form of the budgetary deficit. If the interest rate mechanism is not perfect, are private investors more concerned or affected (through perhaps credit rationing) by the actual deficit, some sort of expected deficit, unanticipated changes in deficit, or even deviations in the deficit from some longer run budgetary trend?
4. The environment in which deficits exist needs to be identified. Obviously, if deficits stem largely from increased government consumption or defence, their negative impact on private investment will be greater than if they had stemmed simply from increased infrastructural investment.
5. The financing of the public sector deficit and government capital formation needs to be examined in detail. Have the deficits been associated with government investment or consumption? How have the deficits been financed as between domestic and foreign borrowing? Do the impacts of domestic versus foreign borrowing vary with regard to their effect on private industrial investment?

The Issue of Causation

Ultimately any statistical test for causation will be based on a number of arbitrary assumptions. Still, using a number of alternative specifications for the key variables it is possible to make some credible inference concerning the timing of say government expenditures and public sector deficits: do some types of government expenditure tend to generate a stream of deficits (and associated public borrowing) over time (soft budgetary constraint⁶) or are selected budgetary allocations constrained by past deficits (hard budgetary constraint). Similarly, which types of expenditures are more likely financed (or constrained) through the domestic capital markets and which are more reliant (or constrained) by foreign borrowing?

The original and most widely used causality test was developed by Granger⁷. According to this test (again using the example of public expenditures and deficits), deficits affect growth of public sector expenditures if this series can be predicted more accurately by past values of deficits than by past (expenditure) growth patterns⁸. To be certain that causality runs from deficits to public expenditures, past values of the public deficit must also be more accurate than past values of public expenditures at predicting increases in the deficit⁹.

Four cases are possible: (a) **Government Deficits cause Public Expenditures** when the prediction error for public expenditures decreases when the government deficits is included in the expenditure equation. In addition, when public expenditures are added to the deficit equation, the final prediction error should increase; (b) **Public Expenditures cause Government Deficits** when the prediction error for public expenditures increases when government deficits are

added to the regression equation for public expenditures, and is reduced when public expenditures are added to the regression equation for government deficits; (c) **Feedback** occurs when the final prediction error decreases when government deficits are added to the public expenditures equation, and the final prediction error decreases when public expenditures are added to the government deficits equation; and (d) **No Relationship** exists when the final prediction error increases both when government deficits are added to the public expenditures equation and when public expenditures are added to the deficit equation.

Operational Procedures

The government expenditure data used to carry out the causation test¹⁰ was derived from data provided by the World Bank¹¹. Figures on Gross Domestic Product and the GDP price deflator is from various issues of the International Monetary Fund, International Financial Statistics Yearbook. All variables were deflated by the GDP deflator and are in constant 1985 prices. For best statistical results,¹² the variables were transformed into their logarithmic values¹³.

To determine the robustness of our findings and whether the results were sensitive to the definition of key variables various measures of the deficit were examined. These included the actual or realized deficit, the expected deficit (the predicted value obtained by regressing each year's deficit on its value for the previous year the unexpected deficit (the difference between each year's actual deficit and that anticipated based on past patterns) and finally deviations of the deficit from its longer run growth path (the actual deficit minus the exponential trend in the deficit). The same definitions were used in deriving series for public domestic borrowing.

Results

Two sets of causality tests were performed. The first set examined the interaction of the three broad categories of government expenditures: (a) defense, (b) consumption, (c) general government investment and (d) infrastructure: (a) private sector investment in large scale manufacturing and (b) private investment in small scale manufacturing enterprises.

The second set of estimates examined the interrelationships between these four types of government expenditures and movements in the fiscal deficit. Since previous studies have suggested that it is not the deficits *per se*, but rather the method by which they are financed (domestic versus foreign) that determines whether crowding out occurs, the second set of tables also takes the analysis a step further by examining the corresponding link between public sector expenditures and the pattern of public sector domestic\foreign borrowing. Put differently even though public expenditures in certain areas may lead to increased budgetary deficits, crowding out might not occur if the authorities are able to fund this expenditure through foreign borrowing.

The analysis produced a number of interesting patterns. In particular those for public expenditures and private investment in manufacturing provide an interesting contrast in the manner in which public sector spending has provided a stimulus to private sector capital formation. Specifically:

1. The impact of defense expenditures (Table 1) on investment in large scale manufacturing appears consistently strong across all measures of this category of expenditures. Also, in all cases the impact lag appears quite short, averaging only a year.

2. In contrast to the case for large scale manufacturing, defense expenditures have no appreciable effect on private investment in small scale manutacturing.
3. As a basis of comparison, public sector expenditures on consumption does not provide a stimulus to private investment in large scale manufacturing. Here, the pattern is largely one whereby expanded private sector activity induces the government to provide additional services. For public services (consumption), this process occurs over a fairly long period with an average lag of three years.
4. While one might anticipate that general government investment, especially in the areas of infrastructural expansion, would provide a stimulus to private investment in manufacturing, this does not appear to be the case. In fact, causation is generally from private investment to public. For actual public investment (including both infrastructural and non-infrastructural components) the lag is rather short-a year. For longer term infrastructural investment (here proxied as expected investment) the lag tends to be about three years. Interestingly deviations of public investment from its historical exponential trend tend to impact negatively on private investment in manufacturing.
5. Private investment in small scale manufacturing is again affected differently than that in larger scale firms. In this case (Table 2) public consumption expenditures provide a weak stimulus to the private sector. This lag is short, averaging about a year.

6. Private investment in smaller scale industrial ventures interacted with public investment in a manner somewhat similar to that found in larger scale enterprises. However several minor differences do appear to characterize investment by the private sector. First, the lag between private investment and the government provision of infrastructure (anticipated investment) was shorter (one year) in the case of small scale firms. Secondly, while investment impacted negatively (not shown here) on private investment in smaller scale firms, there were no statistically significant patterns between private investment and deviations from the exponential trend in public investment.

As noted above, in looking for an explanation for these patterns, several previous papers have indicated that public sector crowding out of private investment may be occurring as a result of stepped-up government borrowing in the domestic financial markets. To examine this possibility, an analysis similar to that performed above was used to identify the linkages and causality patterns between the different broad types of public expenditures (defence, consumption, and general government investment) and potential sources of funding (deficits, domestic borrowing, and foreign borrowing).

Again several interesting patterns appeared:

1. Of the three types of government expenditures, those allocated to defense appear to have the most complex budgetary linkages. In one sense the military faces a hard budgetary constraint in the sense that increases in past deficits tend to suppress the expansion in allocations to the military. On the other hand, increased

defense expenditures do force an expansion in future deficits.

2. This same general framework carried over to the borrowing patterns associated with military expenditures. For most measures of domestic borrowing, higher growth rates in funding from the domestic markets tends to suppress the expansion in future military expenditures. These suppressing effect are most important in cases where the rate of borrowing (domestic or foreign) expands over its anticipated (or longer term) growth rate. Still, feedback effects are present whereby military expenditures are in turn generally funded in part through both domestic and foreign borrowing.
3. Since a large portion of public consumption consists of allocations to the military, the budgetary patterns of this expenditure category are a bit similar to that characterizing defense, particularly consumption's relationship to the fiscal deficit.
4. Several important differences do occur however. The major difference between defense expenditures and public consumption is associated with the manner in which each is actually funded. Increased growth in public consumption definitely contributes to expanded domestic borrowing requirement over time. Also the expansion in public consumption appears to be more constrained than defense during periods of expanded foreign borrowing.
5. Of the three types of government expenditures examined here, general government investment tends to have the strongest impact on the public sector deficit.

6. For all four measures of the deficit, increases in general public investment tends to result in expanded fiscal imbalance. While expanded deficits (actual and deviation from the exponential trend) facilitate a future expansion in public investment, this effect is weak relative to the impact of investment on the deficit.
7. A clear link also exists between expanded public sector investment and increased future domestic borrowing requirements. Interestingly enough few links exist between the growth in public investment and the country's pattern of external public borrowing.

Summary

While the results presented above do not provide a definitive proof of the existence of the crowding out mechanism in Pakistan, they are quite consistent with what one might find if the phenomena were present. Public investment and infrastructural development appear to have the least stimulating (and sometimes negative) effect on private sector investment. This is ironic given that a major purpose of these allocations is to provide a stimulus to follow-on private investment. Clearly this effect stems from the large demands placed on the domestic capital market by this type of expenditure.

At the other extreme is defense. Again a somewhat ironic pattern exists by which expanded military expenditures provide a generally strong stimulus to private investment in large scale private manufacturing. While the analysis does not let us identify the cause of this stimulus (general Keynesian demand expansion and/or direct linkages to the country's military procurement program) the fact remains that the

goverment has shown restraint in funding defense expenditures once domestic borrowing begin to accelerate.

General public consumption falls somewhere between defense and investment in affecting the private sector's willingness (or ability) to commit capital to manufacturing. While the government does fund increased consumption through expanded domestic borrowing, the magnitudes involved are not as great as with investment. Thus government consumption is still able to provide a net positive stimulus to small scale private investors (who presumably are not as reliant on the domestic capital markets as are their larger scale counterparts).

A Macro-Economic Framework

The possible presence of crowding out resulting from increases in government investment and infrastructural development is important for policy design and as such warrants further analysis. For this purpose a small macroeconomic model based on the causality findings was developed.

In constructing the model, our main concern was to capture the main areas in which defense and other government expenditures might conceivably affect private investment. Specifically the model attempts to capture the impact of public expenditures by type on the deficit, the impact of the deficit on the composition of public borrowing (domestic versus foreign) and domestic savings. Ultimately these links modify the private sector's decision to expand or contract capital formation in manufacturing.

Concerning the more important individual relationships:

1. Growth is affected mainly by employment lagged military expenditures and private investment.¹⁴ Interestingly, non-defense expenditures were not statistically significant in affecting GDP. The same was also true for government investment.
2. Defense expenditures were found to be a function of lagged GDP. In addition allocation to the military were found to compete with other forms of public expenditures and were reduced with increased funding of government investment. As noted in the causality analysis, an expansion in the public deficit also depresses the rate of increase in follow-on allocations to the military.
3. Private investment in manutacturing follows a standard¹⁵ distributed lag pattern. Funds allocated to this sector are reduced with increased levels of public sector borrowing in domestic markets. Some of the pressure on capital markets is reduced with increased foreign borrowing. As in the causality tests, military expenditures provide a stimulus to investment in large scale manufacturing (while non-defense expenditures provide a stimulus to investment in smaller scale plants). As noted by Khan and Iqbal¹⁶ private investment is largely influenced by the country's pattern of savings.
4. Gross National Savings¹⁷ expand with the general growth of the economy. However these funds are preempted (or crowded out) by the fiscal deficit.

Historical Simulations

To test the general accuracy of the model, a historical simulation was performed i.e. using the actual values for each variable, how well would the model have predicted each of the major variables over the period 1974 to 1991. The results (Table 1) were encouraging, particularly for the all-important GDP, and total private investment. The largest error for GDP was only 3.76 percent in the year of political crisis (1977).

Because of their smaller, absolute values, however the errors were often high for private investment in manufacturing. Still, during the last several years the predicted figures for private capital allocations to this sector were close to the actual figures.

Roughly the same picture emerges when general government investment was treated as exogenous i.e. when actual rather than estimated values were used in the model solution (Table 2).

The next step was to get an idea of the quantitative magnitudes of impact produced by changes in government investment. In the first set of simulations, government investment was increased (Table 3) by 2.5% and 10% over its historical values (with the other behavioral equations left endogenous). As a basis of comparison, the base figures are those derived (in Table 2) from the actual (realized) levels of government investment.

The results (Table 3) of this simulation provide interesting insights to the dynamics of the Pakistani economy. In particular, increased levels of government investment tend to reduce GDP. The suppression in GDP occurs through the

Table 1

Macroeconomic Simulation I, Endogenous Model, 1974-1991

(billions of 1985 rupees)

| Year | Gross Domestic Product | | | Total Private Investment | | |
|------|------------------------|-------|-------|--------------------------|------|-------|
| | Actual | Est | % Dif | Actual | Est | % Dif |
| 1974 | 264.0 | 245.5 | 0.2 | 15.7 | 17.0 | 7.7 |
| 1975 | 256.8 | 259.8 | 1.2 | 17.5 | 17.9 | 2.3 |
| 1976 | 268.8 | 270.4 | 0.6 | 19.3 | 18.4 | 5.8 |
| 1977 | 278.9 | 290.2 | 3.9 | 20.9 | 19.1 | 9.5 |
| 1978 | 301.4 | 305.6 | 1.4 | 21.7 | 21.0 | 3.6 |
| 1979 | 315.9 | 324.6 | 2.7 | 22.4 | 22.4 | 0.0 |
| 1980 | 343.4 | 341.4 | 0.6 | 26.4 | 24.1 | 9.6 |
| 1981 | 367.0 | 363.7 | 0.9 | 28.5 | 26.1 | 9.4 |
| 1982 | 391.0 | 383.6 | 1.9 | 28.1 | 28.4 | 0.9 |
| 1983 | 417.9 | 408.2 | 2.4 | 30.7 | 30.6 | 0.2 |
| 1984 | 438.7 | 432.5 | 1.4 | 32.8 | 33.3 | 1.3 |
| 1985 | 472.2 | 460.4 | 2.6 | 35.8 | 36.1 | 0.7 |
| 1986 | 498.1 | 481.4 | 3.5 | 38.7 | 39.2 | 1.3 |
| 1987 | 530.1 | 523.3 | 1.3 | 41.1 | 41.9 | 2.0 |
| 1988 | 570.9 | 549.2 | 3.9 | 43.8 | 46.5 | 6.0 |
| 1989 | 611.9 | 588.5 | 4.0 | 51.0 | 49.8 | 2.4 |
| 1990 | 630.9 | 624.4 | 1.0 | 56.0 | 54.2 | 3.3 |
| 1991 | 672.0 | 670.4 | 0.3 | 60.1 | 59.1 | 1.8 |

P.T.O.

| Year | Private Non-Manuf Inves | | | Private Manuf. Invest | | |
|------|-------------------------|------|-------|-----------------------|------|-------|
| | Actual | Est | % Dif | Actual | Est | % Dif |
| 1974 | 12.8 | 13.3 | 4.2 | 3.0 | 3.7 | 20.5 |
| 1975 | 14.0 | 14.6 | 3.7 | 3.4 | 3.3 | 3.9 |
| 1976 | 15.5 | 15.1 | 2.4 | 3.9 | 3.2 | 22.4 |
| 1977 | 16.9 | 15.8 | 6.6 | 4.1 | 3.3 | 23.3 |
| 1978 | 17.9 | 17.3 | 3.4 | 3.9 | 3.7 | 4.7 |
| 1979 | 18.6 | 18.2 | 2.2 | 3.8 | 4.2 | 7.6 |
| 1980 | 21.8 | 19.1 | 14.6 | 4.6 | 5.0 | 9.4 |
| 1981 | 22.5 | 20.0 | 12.5 | 6.0 | 6.0 | 0.5 |
| 1982 | 21.5 | 21.2 | 1.7 | 6.6 | 7.2 | 8.5 |
| 1983 | 22.9 | 22.1 | 3.4 | 7.8 | 8.5 | 8.1 |
| 1984 | 23.9 | 23.3 | 2.6 | 8.9 | 10.0 | 10.5 |
| 1985 | 25.8 | 24.5 | 5.3 | 10.0 | 11.6 | 13.4 |
| 1986 | 26.8 | 25.9 | 3.7 | 11.9 | 13.3 | 10.8 |
| 1987 | 28.5 | 26.8 | 6.2 | 12.6 | 15.1 | 16.7 |
| 1988 | 29.8 | 29.2 | 1.9 | 14.0 | 17.3 | 19.2 |
| 1989 | 32.5 | 30.4 | 6.9 | 18.5 | 19.4 | 4.6 |
| 1990 | 34.3 | 32.1 | 6.7 | 21.7 | 22.1 | 1.5 |
| 1991 | 36.4 | 34.4 | 5.9 | 23.7 | 24.1 | 3.9 |

Table 2

Macroeconomic simulation II: General Government Investment
 Set at Historical Values, Foreign Public Borrowing
 Endogenous, 1974-1991

(billions of 1985 rupees)

| Year | Gross Domestic Product | | | Total Private Investment | | |
|------|------------------------|-------|-------|--------------------------|------|-------|
| | Actual | Est | % Dif | Actual | Est | % Dif |
| 1974 | 246.0 | 245.5 | 0.2 | 15.7 | 17.0 | 7.6 |
| 1975 | 256.8 | 260.0 | 1.3 | 17.5 | 17.9 | 2.4 |
| 1976 | 268.8 | 269.9 | 0.5 | 19.3 | 18.2 | 5.9 |
| 1977 | 278.9 | 290.0 | 3.8 | 20.9 | 19.0 | 10.4 |
| 1978 | 301.4 | 306.8 | 1.8 | 21.7 | 21.5 | 1.0 |
| 1979 | 315.9 | 322.5 | 2.1 | 22.4 | 22.7 | 0.9 |
| 1980 | 343.4 | 342.4 | 0.3 | 26.4 | 23.6 | 11.8 |
| 1981 | 367.0 | 369.4 | 0.6 | 28.5 | 25.2 | 13.1 |
| 1982 | 391.0 | 393.1 | 0.5 | 28.1 | 27.1 | 4.0 |
| 1983 | 417.9 | 423.0 | 1.2 | 30.7 | 30.0 | 2.4 |
| 1984 | 438.7 | 445.9 | 1.6 | 32.8 | 33.6 | 2.3 |
| 1985 | 472.2 | 469.6 | 0.6 | 35.8 | 36.0 | 0.6 |
| 1986 | 498.1 | 491.5 | 1.3 | 38.7 | 38.6 | 0.1 |
| 1987 | 530.1 | 534.2 | 0.8 | 41.1 | 41.8 | 1.8 |
| 1988 | 570.9 | 557.0 | 2.5 | 43.8 | 46.9 | 6.7 |
| 1989 | 611.9 | 593.0 | 3.2 | 51.0 | 50.5 | 1.0 |
| 1990 | 630.9 | 625.6 | 0.9 | 56.0 | 54.9 | 1.9 |
| 1991 | 672.0 | 670.3 | 0.3 | 60.1 | 59.1 | 1.6 |

P.T.O.

| Year | Private Non-Manuf Inves | | | Private Manuf Invest | | |
|------|-------------------------|------|-------|----------------------|-------|-------|
| | Actual | Est | % Dif | Actual | Est | % Dif |
| 1974 | 2.8 | 13.3 | 4.0 | 2.97 | 3.73 | 20.3 |
| 1975 | 14.0 | 14.6 | 3.9 | 3.41 | 3.32 | 3.0 |
| 1976 | 15.5 | 15.1 | 2.3 | 3.86 | 3.13 | 23.0 |
| 1977 | 16.9 | 15.7 | 7.6 | 4.06 | 3.28 | 23.9 |
| 1978 | 17.9 | 17.6 | 1.4 | 3.84 | 3.87 | 0.6 |
| 1979 | 18.6 | 18.5 | 0.5 | 3.84 | 4.15 | 7.3 |
| 1980 | 21.8 | 18.7 | 16.8 | 4.56 | 4.92 | 7.4 |
| 1981 | 22.5 | 19.5 | 15.2 | 6.00 | 5.65 | 6.2 |
| 1982 | 21.5 | 20.5 | 4.8 | 6.61 | 6.52 | 1.4 |
| 1983 | 22.9 | 22.0 | 3.8 | 7.81 | 7.92 | 1.4 |
| 1984 | 23.9 | 24.1 | 0.9 | 8.94 | 9.51 | 6.0 |
| 1985 | 25.8 | 25.0 | 3.3 | 10.02 | 11.04 | 9.3 |
| 1986 | 26.8 | 25.8 | 4.0 | 11.88 | 12.86 | 7.7 |
| 1987 | 28.5 | 27.1 | 5.3 | 12.57 | 14.73 | 14.7 |
| 1988 | 29.8 | 29.8 | 0.2 | 13.98 | 17.08 | 18.2 |
| 1989 | 32.5 | 31.1 | 4.5 | 18.51 | 19.42 | 4.7 |
| 1990 | 34.3 | 32.8 | 4.7 | 21.71 | 22.17 | 2.0 |
| 1991 | 36.4 | 34.4 | 5.7 | 23.73 | 24.70 | 3.9 |

Table 3

Macroeconomic Simulation III: General Government
 Investment 2.5% and 10% over Historical Values, Foreign
 Public Borrowing Endogenous

(Billions of 1985 rupees)

| Year | Gross Domestic Product | | | Total Private Investment | | |
|------|------------------------|-------|-------|--------------------------|------|-------|
| | 2.5% | Base | 10.0% | 2.5% | Base | 10.0% |
| 1974 | 245.3 | 245.5 | 244.9 | 17.0 | 17.0 | 16.9 |
| 1975 | 260.0 | 260.0 | 259.8 | 17.9 | 17.9 | 17.9 |
| 1976 | 269.4 | 269.9 | 268.0 | 18.3 | 18.2 | 18.6 |
| 1977 | 288.5 | 290.0 | 284.7 | 19.1 | 19.0 | 19.4 |
| 1978 | 304.9 | 306.8 | 299.0 | 21.6 | 21.5 | 22.0 |
| 1979 | 319.8 | 322.5 | 311.6 | 22.8 | 22.7 | 23.3 |
| 1980 | 338.9 | 342.4 | 328.1 | 23.8 | 23.6 | 24.3 |
| 1981 | 365.1 | 369.4 | 352.2 | 25.4 | 25.2 | 25.8 |
| 1982 | 388.2 | 393.1 | 373.6 | 27.2 | 27.1 | 27.7 |
| 1983 | 417.5 | 423.0 | 401.0 | 30.1 | 30.0 | 30.7 |
| 1984 | 439.7 | 445.9 | 420.9 | 33.8 | 33.6 | 34.5 |
| 1985 | 462.6 | 469.6 | 441.6 | 36.2 | 36.0 | 36.8 |
| 1986 | 483.9 | 491.5 | 461.1 | 38.8 | 38.6 | 39.4 |
| 1987 | 526.0 | 534.2 | 501.2 | 42.0 | 41.8 | 42.7 |
| 1988 | 548.0 | 557.0 | 521.1 | 47.2 | 46.9 | 47.8 |
| 1989 | 683.3 | 593.0 | 554.2 | 50.8 | 50.5 | 51.5 |
| 1990 | 615.1 | 625.6 | 583.7 | 55.2 | 54.9 | 56.0 |
| 1991 | 659.0 | 670.3 | 625.3 | 59.4 | 59.1 | 60.2 |

P.T.O.

| Year | Private Non-Manuf Inves | | | Private Manuf Invest | | |
|------|-------------------------|------|-------|----------------------|------|-------|
| | 2.5% | Base | 10.0% | 2.5% | Base | 10.0% |
| 1974 | 13.3 | 13.3 | 13.2 | 3.7 | 3.7 | 3.7 |
| 1975 | 14.6 | 14.6 | 14.5 | 3.3 | 3.3 | 3.4 |
| 1976 | 15.2 | 15.1 | 15.3 | 3.2 | 3.1 | 3.3 |
| 1977 | 15.7 | 15.7 | 15.9 | 3.3 | 3.3 | 3.5 |
| 1978 | 17.7 | 17.6 | 17.7 | 4.0 | 3.9 | 4.3 |
| 1979 | 18.5 | 18.5 | 18.6 | 4.3 | 4.2 | 4.7 |
| 1980 | 18.7 | 18.7 | 18.7 | 5.1 | 4.9 | 5.6 |
| 1981 | 19.5 | 19.5 | 19.4 | 5.9 | 5.7 | 6.5 |
| 1982 | 20.5 | 20.5 | 20.3 | 6.7 | 6.5 | 7.4 |
| 1983 | 22.0 | 22.0 | 21.8 | 8.2 | 7.9 | 8.9 |
| 1984 | 24.0 | 24.1 | 23.8 | 9.8 | 9.5 | 10.6 |
| 1985 | 24.9 | 25.0 | 24.6 | 11.3 | 11.0 | 12.3 |
| 1986 | 25.6 | 25.8 | 25.2 | 13.2 | 12.9 | 14.2 |
| 1987 | 26.9 | 27.1 | 26.5 | 15.1 | 4.7 | 16.2 |
| 1988 | 29.7 | 29.8 | 29.2 | 17.5 | 17.1 | 18.6 |
| 1989 | 30.9 | 31.1 | 30.4 | 19.8 | 19.4 | 21.1 |
| 1990 | 32.6 | 32.8 | 32.0 | 22.6 | 22.2 | 24.0 |
| 1991 | 34.2 | 34.4 | 33.6 | 25.2 | 24.7 | 26.6 |

associated reduction in defense expenditures (given the insensitivity of private investment to changes in the levels of public capital formation).

Up to now the simulations have assumed that the pattern of public external borrowing is largely passive, that is determined by the endogenous equation¹² in Table 6. If instead, it is assumed that the government is constrained (to some pre-assigned level) in its borrowing in foreign capital markets the results of the simulations change dramatically (Table 4).

Again as a basis of comparison, three separate values are given for each of the key macroeconomic aggregates: (a) the endogenous values are those obtained by letting public foreign borrowing increase as in Table 9; (b) stet refers to the results obtained when public foreign borrowing was constrained to its realized values over the 1974-1991 period; and (c) actual plus 10% are the values obtained on the assumption that the government could not increase foreign borrowing at will i.e, the government could increase its foreign borrowing at most up to 10% over its actual borrowing levels for any one year.

On the basis of these assumptions, it can be easily seen that even with modest increases (2.5%) in government investment the economy would come under severe strains (Table 4). In particular:

1. With no increase in public external borrowing in 1991, GDP would decline from 659 billion rupees to 570.7 billion.
2. The economy's extreme dependence on external borrowing to offset the public sector's crowding out of private investment appears to have developed around

1984/85 (as evidenced by the widening gap between the values obtained in actual and endogenous simulations).

3. This extreme dependence is evidenced by the fact that in recent years a 2.5 percent increase in government investment would have to be matched by an increase in public foreign borrowing of over 10 percent simply to preserve levels of investment and GDP that would have occurred in the absence of these increases in government investment.

Conclusions

While a complete explanation of the reasons the government has chosen to fund certain expenditures in certain markets is beyond the scope of this study, it is clear that if the Pakistani authorities wish to play a more productive role in the country's development, they will have to devote just as much attention to the financial impacts of public investment as they have to the direct economic impacts.

Table 4

Macroeconomic simulation IV: General Government
Investment 2.5% over Historical Values, With Varying
patterns of Foreign public Borrowing

(billions of 1985 rupees)

| Year Borrow | Gross Domestic Product | | | Total Private Investment | | |
|----------------|------------------------|--------|----------|--------------------------|--------|----------|
| | Endogen | Actual | Act.+10% | Endogen | Actual | Act.+10% |
| 1974 | 245.3 | 245.5 | 245.9 | 17.0 | 17.0 | 17.2 |
| 1975 | 260.0 | 259.3 | 260.6 | 17.9 | 17.7 | 18.1 |
| 1976 | 269.4 | 272.4 | 277.2 | 18.3 | 19.3 | 20.0 |
| 1977 | 288.5 | 294.7 | 299.2 | 19.1 | 21.1 | 22.2 |
| 1978 | 304.9 | 311.2 | 317.6 | 21.6 | 23.1 | 24.4 |
| 1979 | 319.8 | 325.9 | 334.6 | 22.8 | 23.3 | 25.0 |
| 1980 | 338.9 | 346.6 | 358.2 | 23.8 | 24.4 | 26.4 |
| 1981 | 365.1 | 373.1 | 387.4 | 25.4 | 26.3 | 28.7 |
| 1982 | 388.2 | 299.6 | 414.3 | 27.2 | 28.2 | 31.0 |
| 1983 | 417.5 | 424.4 | 445.8 | 30.1 | 30.5 | 33.8 |
| 1984 | 439.7 | 442.1 | 468.7 | 33.8 | 32.8 | 36.6 |
| 1985 | 462.6 | 459.7 | 489.9 | 36.2 | 33.7 | 38.2 |
| 1986 | 483.9 | 472.7 | 508.3 | 38.8 | 34.5 | 39.6 |
| 1987 | 526.0 | 503.8 | 545.6 | 42.0 | 35.8 | 41.8 |
| 1988 | 548.0 | 511.0 | 560.0 | 47.2 | 38.4 | 45.4 |
| 1989 | 583.3 | 530.2 | 587.8 | 50.8 | 39.7 | 47.9 |
| 1990 | 615.1 | 545.7 | 613.6 | 55.2 | 42.4 | 52.2 |
| 1991 | 659.0 | 570.7 | 650.5 | 59.4 | 44.6 | 56.1 |

| Year Borrow | Private Non-Manuf Inves | | | Private Manuf Invest | | |
|----------------|-------------------------|--------|----------|----------------------|--------|----------|
| | Endogen | Actual | Act.+10% | Endogen | Actual | Act.+10% |
| 1974 | 13.2 | 13.2 | 13.2 | 3.7 | 3.7 | 3.9 |
| 1975 | 14.6 | 14.6 | 14.5 | 3.3 | 3.1 | 3.5 |
| 1976 | 15.2 | 15.1 | 15.2 | 3.2 | 4.2 | 4.9 |
| 1977 | 15.7 | 15.9 | 16.1 | 3.3 | 5.2 | 6.2 |
| 1978 | 17.7 | 18.0 | 18.2 | 4.0 | 5.1 | 5.3 |
| 1979 | 18.5 | 18.7 | 18.9 | 4.3 | 4.7 | 6.0 |
| 1980 | 18.7 | 18.9 | 19.2 | 5.1 | 5.5 | 7.2 |
| 1981 | 19.5 | 19.0 | 20.3 | 5.9 | 6.4 | 8.3 |
| 1982 | 20.5 | 20.8 | 21.4 | 6.7 | 7.4 | 9.7 |
| 1983 | 22.0 | 22.2 | 22.9 | 8.2 | 8.2 | 10.8 |
| 1984 | 24.0 | 24.3 | 25.1 | 9.8 | 8.6 | 11.5 |
| 1985 | 24.9 | 25.0 | 26.0 | 11.4 | 8.8 | 12.2 |
| 1986 | 25.6 | 25.4 | 26.6 | 13.2 | 9.1 | 13.0 |
| 1987 | 26.9 | 26.4 | 27.8 | 15.1 | 9.4 | 14.0 |
| 1988 | 29.7 | 28.8 | 30.4 | 17.5 | 9.7 | 15.0 |
| 1989 | 30.9 | 29.4 | 31.3 | 19.8 | 10.3 | 16.6 |
| 1990 | 32.6 | 30.4 | 32.7 | 22.6 | 12.0 | 19.5 |
| 1991 | 34.2 | 31.5 | 34.2 | 25.2 | 13.1 | 21.9 |

Notes:

1. Pakistan: Current Economic Situation and Prospects, Report No. 9283-PAK (Washington: The World Bank March 22, 1991), p.ii.
2. See for example A.R. Kemal, "Fiscal Imbalances as an Obstacle to Privatization Effort"

The Pakistan Development Review, vol. 28, no.4, Part II (Winter 1989), pp.1009-1019; Nadeem Burney and Attiya Yasmeen, "Government Budget Deficits and Interest Rates: An Empirical Analysis for Pakistan, "The Pakistan Development Review (Winter 1989), Vol.28, No. 4, Part II pp.971-980; and A.H, Khan and Z.Iqbal, "Fiscal Deficit and Private Sector Activities in Pakistan, "Economia Internazionale (May-August 1991), vol.XLIV, no.2-3, pp. 182-190.

3. As Richards and Waterbury note: "We may estimate, counterfactually, the returns on alternative uses of the moneys devoted to defense, but practically nowhere in the world is there any assurance that reduced defense budgets would result in increased outlay on say, social welfare or infrastructure. Defense outlays are laden with the symbols and sentiments of national pride and survival. People seem prepared to accept disproportionate public investment in defense. They and their leaders find less justification in using equivalent resources to reduce adult illiteracy or line irrigation ditches." Alan Richards and John Waterbury, *A Political Economy of the middle East: State Class, and Economic Development* (Moulder, Colorado: Westview Press 1990), pp.360-61.
4. See Robert E. Looney, "Infrastructure and Private Sector Investment; The case of: Pakistan's Transportation and Communications Sector, 1972-1990" *Rivista Internazionale di Scienze Economiche e Commerciali*, vol.XXXIX, no. 9 (September 1992), pp.771-792; Robert E. Looney "Infrastructural Constraints on Transport and Communications: The Case of Pakistan" *International Journal of Transport*

Economics, vol. XIX no.3 (October 1992), pp287-306 ; and Robery E Looney "Infrastructural constraints on Energy Development: The Case of Pakistan "The Journal of Energy and Development Vol.XVI, no.2 (Spring 1991), pp.267-286.

5. Gupta does make an attempt to identify the relevant lag structure, but these are arrived at in a somewhat arbitrary manner.
6. Janos Kornai, "The Soft Budgetary Constraint" *Kyklos*, vol.39, no.1, pp.3-30.
7. C.W.J.Granger, "Investigationg Causal Relations by Econometric Models and Cross-Spectral Methods, *Econometrica* (1969), pp.424-438.
8. More formally, Granger defines causality such that X Granger causes (G-C)Y if Y can be predicted more accurately in the sense of mean square error, with the use of past values of X than without using past X.
9. As is well known however, the results of Granger causality tests depend critically on the choice of lag length. If the chosen lag length is less than the true lag length, the omission of relevant lags can cause bias. If the chosen lag is greater than the true lag length, the inclusion of irrelevant lags causes edtimates to be inefficient. While it is possible to choose lag lengths based on preliminary partial autocorrelation methods, there is no a priori reason to assume lag lengths equal for all types of deficits. To overcome this problem the estimates reported below uses a Hsiao method to systematically identify the optimal lag. Cf. C. Hsiao, "Autoregressive Modeling and Money-Income causality

Detection," *Journal of Monetary Economics* (1081) pp.85-106 and C. Hsiao "Causality Tests in Econometrics," *Journal of Economic Dynamics and control* (1979), p.326.

10. Causation test were performed using a program written in **RATS386 Version 4.0**. Cf. Thomas A. Doan, RATS User's Manual Version 4 (Evanston, Illinois: Estima, 1992).

11. World Bank, Pakistan: Current Economic Situation and Prospects--Report No.10223-PAK (March 16, 1992). World Bank, Pakistan:Current Economic Situation and Prospects--Report No. 9283-PAK (March 22, 1991) World Bank: Pakistan: Progress Under the Sixth Plan (1984).

12. The reasons underlying involve the assumption of stationary conditions. See C. Hsiao, "Autoregressive Modeling and Money-Income Causality Detection" *Journal of Monetary Economics* (1981), pp.85-106 and W.Joerding, "Economic Growth and Defense Spending: Granger Causality, *Journal of Development Enonomics* (1986),pp.35-40

13. Dickey-Fuller tests for unit roots indicated that none were present when the variables were transformed to logarithms. See Jurgen A.Doornik and David F.Hendry, PC Give, Version 7: An Interactive Econometric Modelling System (Oxford: Institute of Economics and Statistics, 1992) for a description of this test and its interpretation.

14. Ideally one would have liked to use a neo-classical formulation of the type developed by Mintz and Huang and adopted successfully by Ward et al to the Indian situation. Unfortunately in the case of Pakistan several

of the key variables (in particular no-defense expenditures and government investment were not statistically significant. See Alex Mintz and C. Huang "Defense Expenditures, Economic Growth and the peace Dividend" *American Political Science Review*, vol.84(1990), pp.1283-93; and Michael Ward et al., Economic Growth, Investment and Military Spending in India, 1950-88" in Steve Chan and Alex Mintz eds., Defense, Welfare, and Growth: Perspectives and Evidence (London: Routledge, 1992), pp. 119-36.

15. See Robert Pindyck and Daniel L. Rubinfeld, *Econometric Models and Economic Forecasts* (New York: McGraw Hill, 1976) for a description of this model and its theoretical rationale.
16. A.H. Khan and Z. Iqbal, "Fiscal Deficit and Private Sector Activities in Pakistan" *Economia Internazionale* (May-August 1991), vol XLIV, no. 2-3, pp.182-190.
17. It should be noted that Gross National Savings is used here. Due to the large component of worker remittances Gross Domestic Savings fluctuates erratically. These remittances are no doubt purely exogenous and as such tend to mask the relationship between government expenditures, the deficit and the change in savings.